Phycoremediation potential of brown macroalgae species Saccharina latissimi and Laminaria digitata towards inorganic arsenic in a multitrophic pilot-scale experiment

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Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

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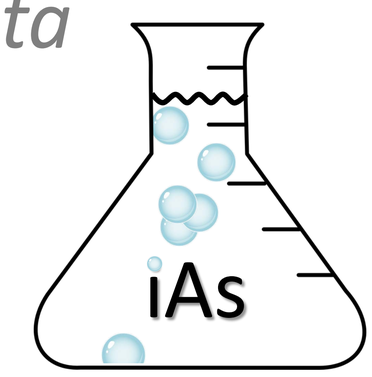

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Intro. Phycoremediation has emerged as one of the most promising and cost-effective technologies, which uses the macroalgae capacity to remove, degrade or render harmful contaminants in aquatic systems. Arsenic (As) is a ubiquitous metalloid which is bioaccumulated in the marine food chain and inorganic arsenic (iAs) is considered to be the most toxic form of arsenic.

Aim. To evaluate the phycoremediation capacity of the two brown seaweed species Sugar kelp (*Saccharina latissima,* SL) and Oarweed (*Laminaria digitata,* LD) in a controlled multitrophic (water, algae, mussels) pilot experiment with 0, 6, 12 h, … up to 15 days (360 h) exposure to iAs.

Results.

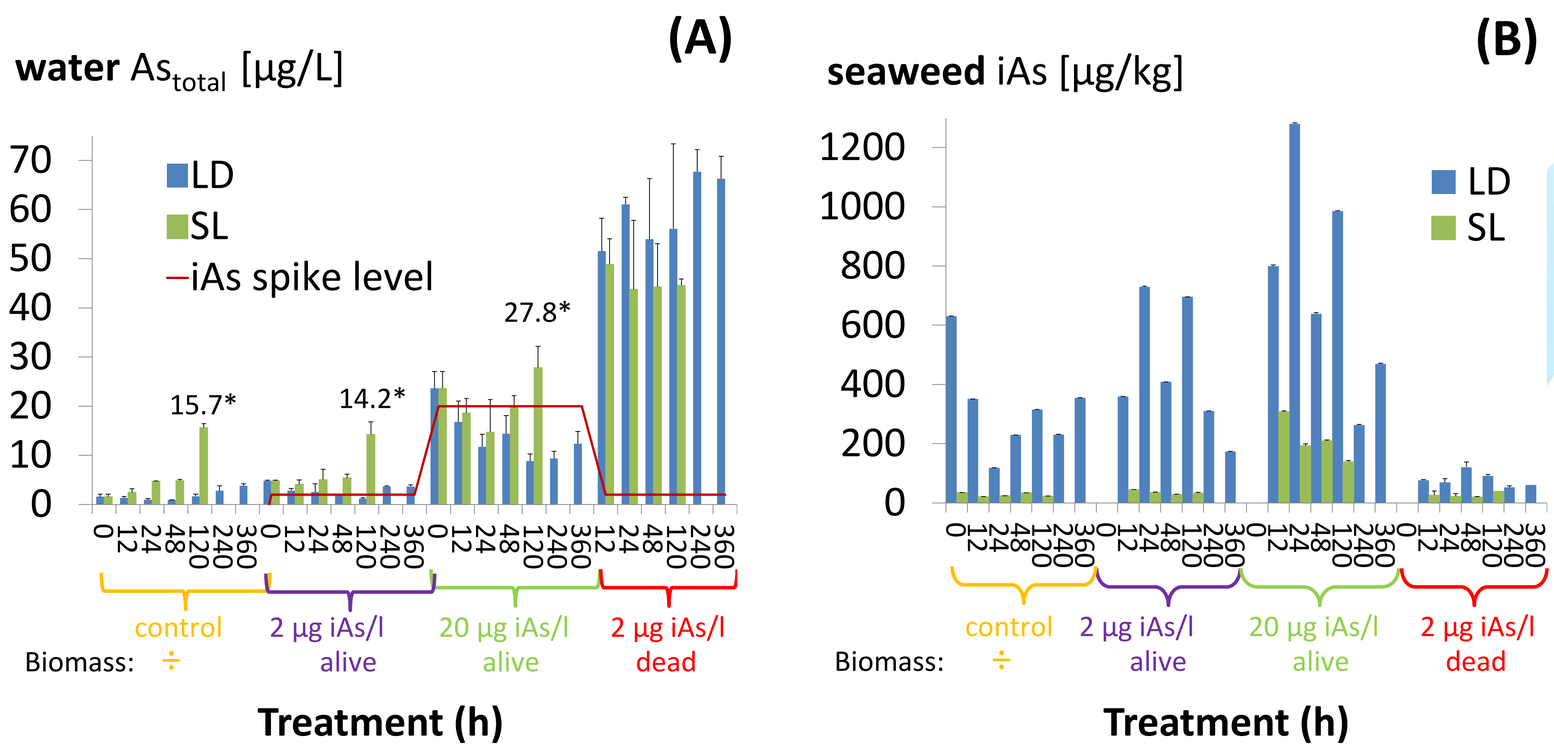

Figure 1. As conc. (mean±SD) in A) seawater sampled twice and B) seaweed from tanks added iAs with dead or alive LD and SL.

- Water (As$_{total}$) LD < SD. Dead algea releases As. * (SL) biomass released As.
- Seaweed (iAs) LD > SD in absolute levels. Low iAs in dead biomass.

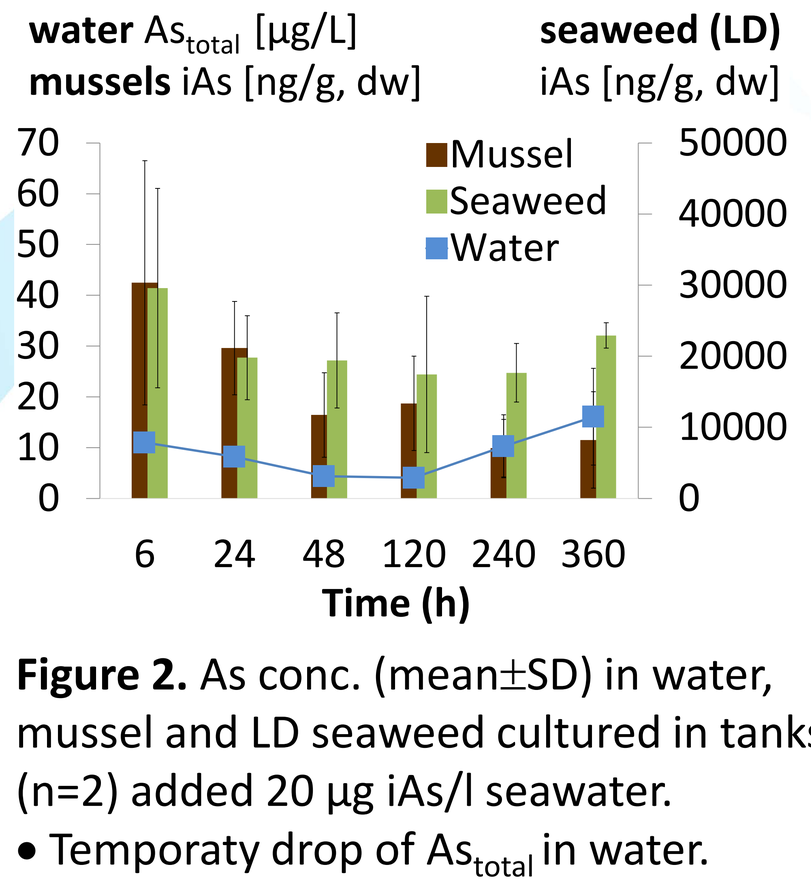

Figure 2. As conc. (mean±SD) in water, mussel and LD seaweed cultured in tanks (n=2) added 20 µg iAs/l seawater.

- Temporaty drop of As$_{total}$ in water.

Conclusion. *Laminaria digitata* was most efficient for removal of arsenic from seawater and hence a better choice for phycoremediation practices towards this parameter.

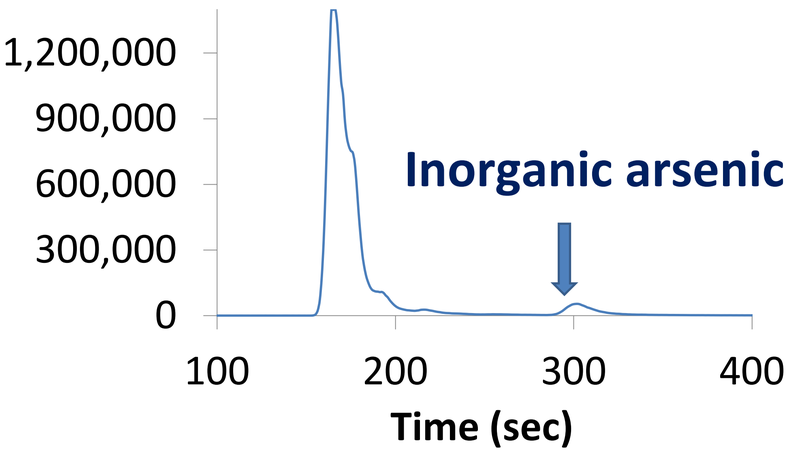

Figure 3. As speciation for LD, 12 h exposure, 20 µg iAs/l. • iAs << As$_{total}$

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement no 311820. This publication reflects the views only of the author, and the European Union cannot be held responsible for any use which may be made of the information contained therein.